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NATIONAL DAM SAFETY PROGRAM, BAUMBARTNER DAM (MO 10883), MISSOURI--ETC(U)
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BAUMGARTNER DAM

CALLAWAY COUNTY, MISSOURI

MO. 10883

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PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



United States Army
Corps of Engineers
... Serving the Army
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St. Louis District

PREPARED BY: U.S. ARMY ENGINEER DISTRICT, ST. LOUIS

FOR: STATE OF MISSOURI

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report was prepared under the National Program of Inspection of Non-Federal Dams. This report assesses the general condition of the dam with respect to safety, based on available data and on visual inspection, to determine if the dam poses hazards to human life or property.		

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BAUMGARTNER DAM
CALLAWAY COUNTY, MISSOURI
MISSOURI INVENTORY NO. 10883

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PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM.

Baumgartner Dam (MO 10883),
Missouri - Kansas City Basin,
Callaway County, Missouri. Phase I
Inspection Report.

PREPARED BY
HOSKINS-WESTERN-SONDEREGGER, INC.
CONSULTING ENGINEERS
LINCOLN, NEBRASKA

UNDER DIRECTION OF
ST. LOUIS DISTRICT, CORPS OF ENGINEERS

FOR

GOVERNOR OF MISSOURI

JUN 1979

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DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 TUCKER BOULEVARD, NORTH
ST. LOUIS, MISSOURI 63101

SUBJECT: Baumgartner Dam Phase I Inspection Report

This report presents the results of field inspection and evaluation of the Baumgartner Dam. It was prepared under the National Program of Inspection of Non-Federal Dams.

SUBMITTED BY: SIGNED 24 MAR 1980
Chief, Engineering Division Date

APPROVED BY: SIGNED 24 MAR 1980
Colonel, CE, District Engineer Date

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
ASSESSMENT SUMMARY

Name of Dam	Baumgartner Dam
State Located	Missouri
County Located	Callaway County
Stream	Tributary to Owl Creek
Date of Inspection	June 1, 1979

Baumgartner Dam was inspected by an interdisciplinary team of engineers from Hoskins-Western-Sonderregger, Inc. The purpose of the inspection was to make an assessment of the general condition of the dam with respect to safety, based upon available data and visual inspection, in order to determine if the dam poses hazards to human life or property.

The guidelines used in the assessment were furnished by the Department of the Army, Office of the Chief of Engineers, and developed with the help of several Federal and State agencies, professional engineering organizations, and private engineers. Based on these guidelines, this dam is classified as a small size dam with a high downstream hazard potential. Failure would threaten life and property. The estimated damage zone extends approximately three miles downstream of the dam. Within the damage zone are a church, two dwellings and a Highway F bridge.

Our inspection and evaluation indicates that the spillway does meet the criteria set forth in the recommended guidelines for a small dam having a high hazard potential. Considering the small volume of water impounded and the large floodplain downstream of the dam, one-half of the Probable Maximum Flood is the appropriate spillway design flood. The spillway will pass the 100-year flood (flood having a one percent chance of being exceeded in any year) without overtopping the dam. The spillway will pass 50% of the Probable Maximum Flood without overtopping the dam. The Probable Maximum Flood (PMF) is defined as the flood that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.

No design data were available for this dam. Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency. These analyses should be obtained in the future.

Other deficiencies observed during the inspection are some slumping of the upstream slope and the crest; a rodent hole in the crest; heavy tree growth on the downstream slope; erosion of the downstream toe; seepage in the left abutment trough; and severe erosion of the spillway outlet.

Maintenance of the downstream slope and the spillway outlet is very deficient. Preventative maintenance items related to the tree growth, rodent holes and erosion of the spillway and toe of the dam need to be initiated by the owner as described in more detail in the body of the report.

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PHOTO NO. 1 - OVERVIEW

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
BAUMGARTNER DAM - MO 10883
CALLAWAY COUNTY, MISSOURI

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

- a. Authority. The National Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of safety inspection of dams throughout the United States. Pursuant to the above, the St. Louis District, Corps of Engineers, District Engineer directed that a safety inspection of Brady Dam be made.
- b. Purpose of Inspection. The purpose of the inspection was to make an assessment of the general condition of the dam with respect to safety, based upon available data and visual inspection, in order to determine if the dam poses hazards to human life or property.
- c. Evaluation Criteria. Criteria used to evaluate the dam were furnished by the Department of the Army, Office of the Chief of Engineers, in "Recommended Guidelines for Safety Inspection of Dams", Appendix D to "Report of the Chief of Engineers on the National Program of Inspection of Dams," dated May, 1975, and published by the Department of the Army, Office of the Chief of Engineers.

1.2 DESCRIPTION OF PROJECT

- a. Description of Dam and Appurtenances.
 - (1) The dam is an earth fill located in the Central Mississippi Valley wooded slope physiographic area of Central Missouri. Topography of the area is gently rolling with moderately deep loess covering the uplands. Two excavated ponds divided by a narrow strip of land are located immediately downstream from the dam.
 - (2) The uncontrolled spillway consists of a vegetated earth channel cut through the left abutment. The spillway discharges into the adjoining downstream pond.

(3) Pertinent physical data are given in paragraph 1.3 below.

- b. Location. The dam is located in the west central part of Callaway County, Missouri, as shown on Plate A-2. The dam is shown on Plate A-1 in the NW $\frac{1}{4}$ of Section 36, T48N, R11W. The lake formed behind the dam is shown in the NW $\frac{1}{4}$ of Section 36, T48N, R11W.
- c. Size Classification. Criteria for determining the size classification of dams and impoundments are presented in the guidelines referenced in paragraph 1.1c above. Based on these criteria, this dam and impoundment is in the small size category.
- d. Hazard Classification. Guidelines for determining hazard classification are presented in the same guidelines as referenced in paragraph 1.1c above. Based on referenced guidelines, this dam is in the High Hazard Classification. The estimated damage zone extends approximately three miles downstream of the dam. Within the damage zone are a church, two dwellings and a Highway F bridge.
- e. Ownership. The dam is owned by J.C. Baumgartner, Route 5, Fulton, Missouri 65251.
- f. Purpose of Dam. The purpose of the dam is for erosion control (gulley head cutting) and recreation.
- g. Design and Construction History. No information was available on the design or construction of this dam. The size of the trees on the downstream slope would indicate that it was probably built in the early 1960's.
- h. Normal Operating Procedure. There are no operating procedures for this dam. The spillway is uncontrolled.

1.3 PERTINENT DATA

- a. Drainage Area. 61.3 acres (.096 square miles).
- b. Discharge at Damsite.
 - (1) All discharges at the damsite are through an uncontrolled earthen spillway.
 - (2) Estimated maximum flood at damsite - unknown.

- (3) The earthen spillway capacity varies from 0 c.f.s. at its crest elevation 830.0 feet to 330± c.f.s. at elevation 832.8 feet (minimum top of dam).

c. Elevations (feet above M.S.L.).

- (1) Top of Dam - 832.8± (low point)
- (2) Spillway crest - 830.0±
- (3) Streambed at centerline - 803.7±
- (4) Maximum tailwater - unknown

d. Reservoir. Length (feet) of maximum pool - 1100±.

e. Storage (Acre-feet).

- (1) Top of dam - 75±
- (2) Spillway crest - 42±

f. Reservoir Surface (Acres).

- (1) Top of dam - 10±
- (2) Spillway crest - 7±

g. Dam.

- (1) Type - Earth fill
- (2) Length - 750 feet ±
- (3) Height - 29 feet ± (maximum)
- (4) Top width - 16 feet ± (crown down centerline)
- (5) Side slopes.
 - (a) Downstream - 3.2 H on 1V ± (measured)
 - (b) Upstream - 4.3 H on 1V (measured exposure)
- (6) Zoning - unknown
- (7) Impervious core - unknown
- (8) Cutoff - unknown
- (9) Grout curtain - unknown
- (10) Wave protection - none

h. Diversion Channel and Regulating Tunnel. None.

i. Spillway.

- (1) Principal (and only)
 - (a) Type - uncontrolled, vegetated earth channel cut through the left abutment with a 30 foot± bottom width at the centerline of the dam.

- (b) Control section - the control section is downstream about 75 feet from the centerline of the dam where the cross section is restricted to a 10 foot± bottom width. The channel slopes down at approximately 1% from the crest to the control section.
- (c) Crest elevation - 830 ft.± at inlet, 829.2 ft.± at control section.
- (d) Upstream Channel. The channel is well vegetated and open.
- (e) Downstream Channel - the exit channel drops off abruptly into an eroded gulley about 100 feet downstream from the centerline of the dam.

j. Regulating Outlets. None

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

No design data were available for this dam.

2.2 CONSTRUCTION

No construction data were available.

2.3 OPERATION

No data were available on spillway operation.

2.4 EVALUATION

- a. Availability. No data were available.
- b. Adequacy. The field surveys and visual observation presented herein are considered adequate to support the conclusion of this report. Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency. These seepage and stability analyses should be performed for appropriate loading conditions (including earthquake loads) and made a matter of record.
- c. Validity. Not applicable.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General. A visual inspection of the Baumgartner Dam was made on June 1, 1979. Engineers from Hoskins-Western-Sonderregger, Inc., Lincoln, Nebraska, making the inspection were: R.S. Decker, Geotechnical; Gordon Jamison, Hydrology and Mike McMeekin, Civil Engineer. The owner of the dam was not present during the inspection.

b. Dam.

- (1) Geology and Soils (Abutment and Embankment).
Soils on the site consist of CL loess on the uplands with residual soils derived from glacial till or from limestone and/or shale on the valley slopes. Material exposed in the lower portion of the right abutment was reddish-brown CH soil which appeared to be residuum from limestone. Material exposed in the left abutment spillway cut is brown CL-CH soil, very blocky with gray silty intrusions overlying what appeared to be a silty or clay silt shale formation. (See Photos 12 and 13.)
- (2) Upstream Slope. The upstream slope is well vegetated with grasses and reeds. No significant erosion was noted on the face. Some slumping of the upstream slope was observed between stations 5+00 and 5+50. No other deformations or cracks were observed on the upstream slope.
- (3) Crest. The crest is well vegetated with adapted grasses. A rodent hole about 9 inches in diameter was observed at about station 7+00. The profile along the crest is remarkably uniform. The top of the dam is higher (crowned) along the centerline with slight slopes both up and down from the crown. Borings on the crest show about 1 foot of gray limey CL-ML with yellow to reddish brown CL-CH material from 1 foot to 2.5 feet. The crest has slumped upstream between stations 5+00 and 5+50 and downstream between stations 4+50 and 4+75. No other deformations or cracks were noted.

- (4) Downstream slope. The downstream slope is almost entirely covered with oak, sycamore and cottonwood trees up to 8 inches in diameter. The toe of the dam is eroded with rills and gullies caused by wave wash from the pond which encroaches on the toe of the dam. Seepage was observed in the left abutment trough downstream from about station 6+75. The seepy spot is about 20 feet wide and about 5 feet above the level of the pond adjoining the toe of the dam. Free water but no flow was observed in the seep area. All effluent was clear. No other indications of seepage were noted. No cracks, rodent holes or abnormal deformations were noted on the downstream slope.
- (5) Miscellaneous. The vegetative cover and the materials in the dam would indicate that the structure could withstand overtopping without serious damage.

c. Appurtenant Structures.

- (1) The spillway consists of an uncontrolled, well vegetated channel cut into the left abutment. Measurements indicate that the channel slopes downstream from the inlet elevation. Spillway discharge is controlled by a contraction in the cross section some 100 feet downstream from the inlet. The spillway exits into a deeply eroded gulley about 125 feet downstream from the inlet. The gulley is eroded into a silty shale formation. No significant erosion was noted in the spillway channel except in the outlet gulley which is severely eroded.
- (2) Drawdown Facilities. There are no drawdown facilities for this dam.

- d. Reservoir Area. No significant erosion or wave wash was observed around the shoreline of the reservoir.
- e. Downstream Channel. There is no channel downstream from the dam. The excavated pond at the downstream toe of the dam receives the discharges from this structure.

3.2 EVALUATION

This dam does not appear to have an immediate serious potential of failure. The effect of seepage in the left abutment trough is not known but it does not appear to be critical. Tree growth on the downstream slope could ultimately lead to potential of failure. Progression of the gulley headcut at the spillway outlet could lead to breaching of the dam; however, there is a sizable mass of fairly erosion resistant material between the present headcut and the reservoir. Wave wash of the downstream toe caused by the adjoining pond could damage the structure if left uncontrolled.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

There are no controlled outlet works for this dam. The pool level is controlled by rainfall, infiltration, evaporation, and the capacity of the uncontrolled spillway.

4.2 MAINTENANCE OF DAM

Maintenance of the downstream section of the dam and of the spillway outlet is very deficient.

4.3 MAINTENANCE OF OPERATING FACILITIES

No operating facilities exist at this dam.

4.4 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

There is no warning system in effect for this dam.

4.5 EVALUATION

There does not appear to be any serious potential of failure of this structure.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

- a. Design Data. No design data were found for this dam.
- b. Experience. There are no available records of reservoir operation.
- c. Visual Observations. The dam has only one spillway which is an uncontrolled earthen spillway located on the left abutment. The water surface was observed to be at the elevation of the crest of the spillway. The spillway is well vegetated with grasses and has a few trees growing in it. The spillway has eroded forming a gully beginning approximately 125 feet downstream of the dam. A control section is formed downstream because the grade becomes very steep. The spillway becomes narrower at the control section forming a restriction.
- d. Overtopping Potential. The spillway is too small to pass the probable maximum flood without overtopping. The spillway will pass the 100-year flood and 50% of the probable maximum flood without overtopping of the dam. The dam could withstand overtopping without serious damage.

The results of the routings through the dam are tabulated below.

<u>Frequency</u>	<u>Peak Inflow Discharge c.f.s.</u>	<u>Peak Outflow Discharge c.f.s.</u>	<u>Maximum Pool Elevation</u>	<u>Freeboard Top of Dam Min. Elev. 832.8</u>	<u>Duration of Dam Overtopping Hr.</u>
100 yr.	280	90	831.2	+1.6	0
1/2 PMF	550	270	832.5	+0.3	0
PMF	1,100	980	833.4	-0.6	1±

The drainage area and reservoir surface area of the watershed were determined from the U.S.G.S. Millersburg NE, Missouri, 7½ minute topographic quadrangle map. The hydraulic computations for the spillway and dam overtopping discharge ratings were based on data collected during the field inspection. Hydrologic and hydraulic computations are described in Appendix D.

According to the recommended guidelines from the Department of the Army, Office of the Chief of Engineers, this dam is classified as having a high hazard rating and a small size. Therefore, the 1/2 PMF to the PMF is the test for the adequacy of the dam and its spillway.

The estimated damage zone is described in Paragraph 1.2d in this report.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

- a. Visual Observation. The dam appears to be structurally stable. The flat slopes and the materials in the dam would provide adequate safety against shear failures for a dam of this height. The deficiencies in maintenance (trees on the downstream slope) could ultimately impair the integrity of the structure.
- b. Design and Construction Data. No design or construction data were available. Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency.
- c. Operating Records. There are no controlled operating facilities for this dam.
- d. Post Construction Changes. The inspection team is not aware of any post construction changes for this structure.
- e. Seismic Stability. This dam is located in Seismic Zone 1. An earthquake of the magnitude predicted in this area is not expected to cause structural failure of this dam.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

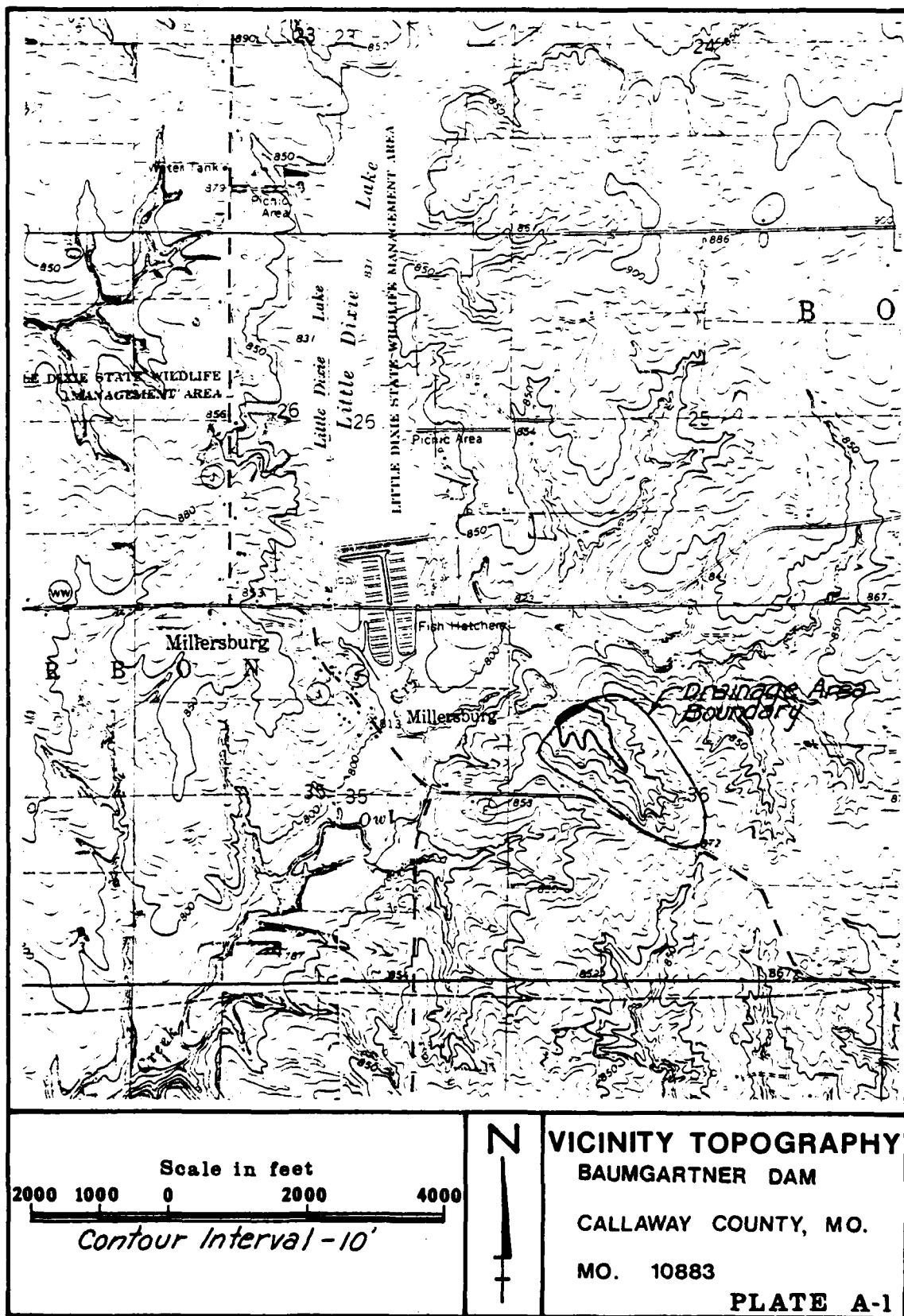
- a. Safety. There does not appear to be a serious potential of failure of this structure. Analyses presented in Section 5 indicate that the spillway will pass one half of the Probable Maximum Flood without overtopping. The adverse effects of abutment seepage are not known, but would not appear to be serious. Deficiencies in maintenance, trees on the downstream slope and erosion of the spillway exit should be corrected and/or controlled.
- b. Adequacy of Information. Due to the lack of engineering data, the conclusions in this report are based upon performance history and visual observations. Seepage and stability analyses comparable to the requirements of the guidelines were not available which is considered a deficiency.
- c. Urgency. There does not appear to be an immediate urgency to accomplish the remedial measures recommended in paragraph 7.2.
- d. Necessity for Phase II. Phase II investigation is not considered necessary.
- e. Seismic Stability. This dam is located in Seismic Zone 1. An earthquake of this magnitude is not expected to be hazardous to this dam.

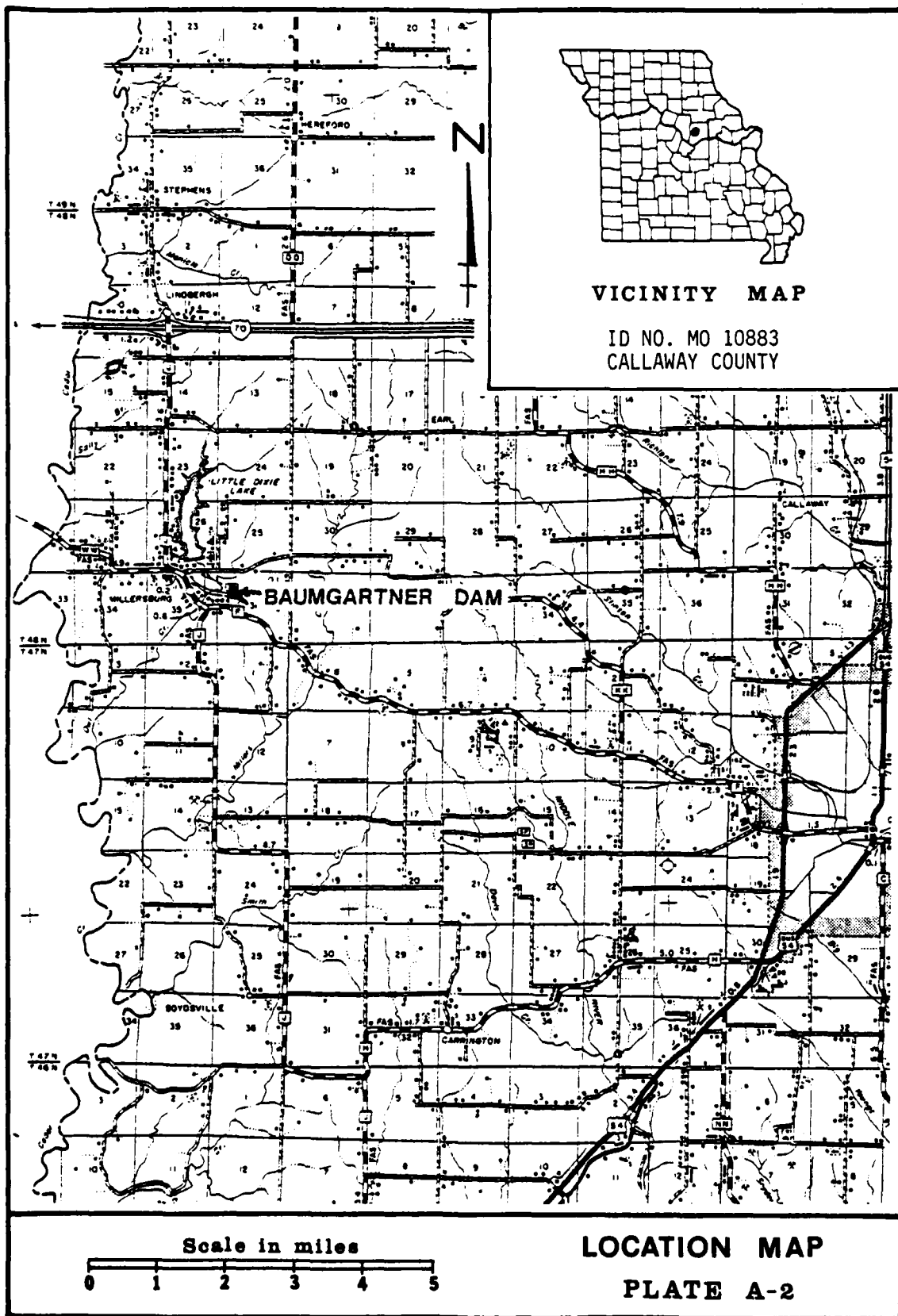
7.2 REMEDIAL MEASURES

- a. Alternatives. The services of an engineer experienced in the design of dams should be obtained to provide seepage and stability analyses of the present dam, and to design protective measures, if required.
- b. O & M Procedures.
 - (1) The tree growth should be removed from the downstream slope and measures taken to prevent their recurrence.
 - (2) Measures should be taken to control the erosion and headcutting in the spillway exit channel.

- (3) The rodent hole observed on the crest and any other observed should be repaired.
- (4) A program of regular inspection and maintenance should be initiated with particular concern for tree growth on the dam, rodent activity, excessive erosion in the spillway and along the toe of the dam, and any changes in seepage pattern or volume.

APPENDIX A
MAPS





APPENDIX B
PHOTOGRAPHS

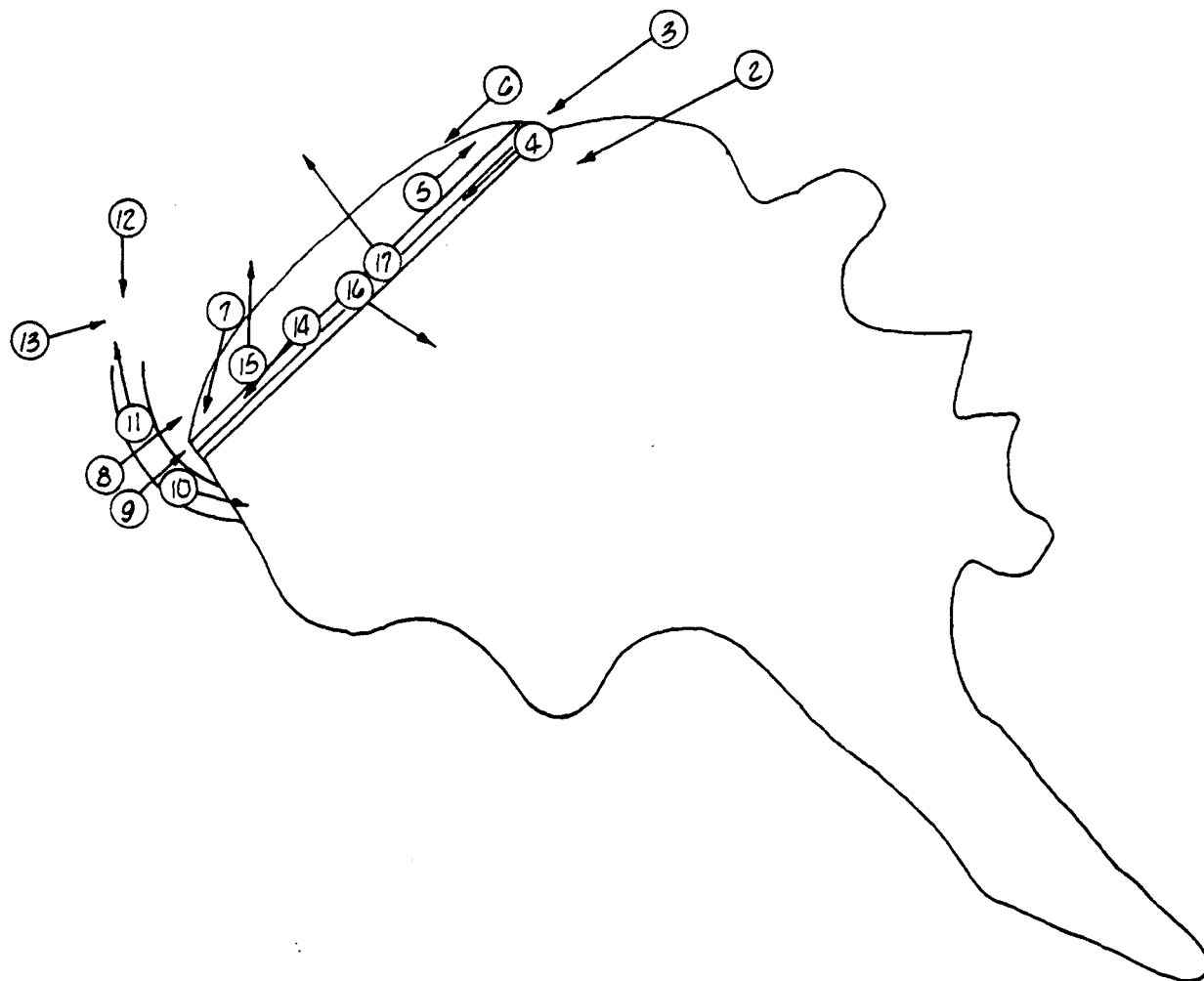


PHOTO INDEX
BAUMGARTNER DAM
CALLAWAY COUNTY, MISSOURI
MO. 10883

PLATE B-1



PHOTO NO. 2 - OVERVIEW TAKEN FROM RIGHT ABUTMENT



PHOTO NO. 3 - CREST TAKEN FROM RIGHT END



PHOTO NO. 4 - UPSTREAM SLOPE TAKEN FROM RIGHT END



PHOTO NO. 5 - DOWNSTREAM SLOPE FROM RIGHT END. FARM POND
AT EXTREME RIGHT



PHOTO NO. 6 - DOWNSTREAM TOE. NOTE EROSION CAUSED BY FARM POND.



PHOTO NO. 7 - SEEPAGE IN LEFT ABUTMENT TROUGH



PHOTO NO. 8 - DOWNSTREAM SLOPE TAKEN FROM LEFT ABUTMENT.



PHOTO NO. 9 - CREST OF DAM TAKEN FROM LEFT END.



PHOTO NO. 10 - VIEW UPSTREAM IN SPILLWAY

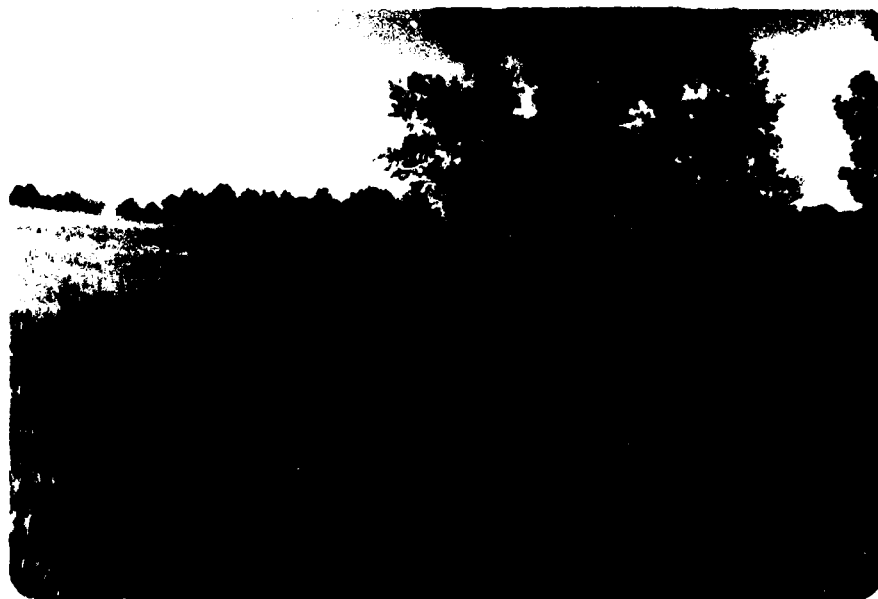


PHOTO NO. 11 - VIEW DOWNSTREAM IN SPILLWAY



PHOTO NO. 12 - EXIT CHANNEL
OF SPILLWAY SHOWING
HEAD CUTTING.

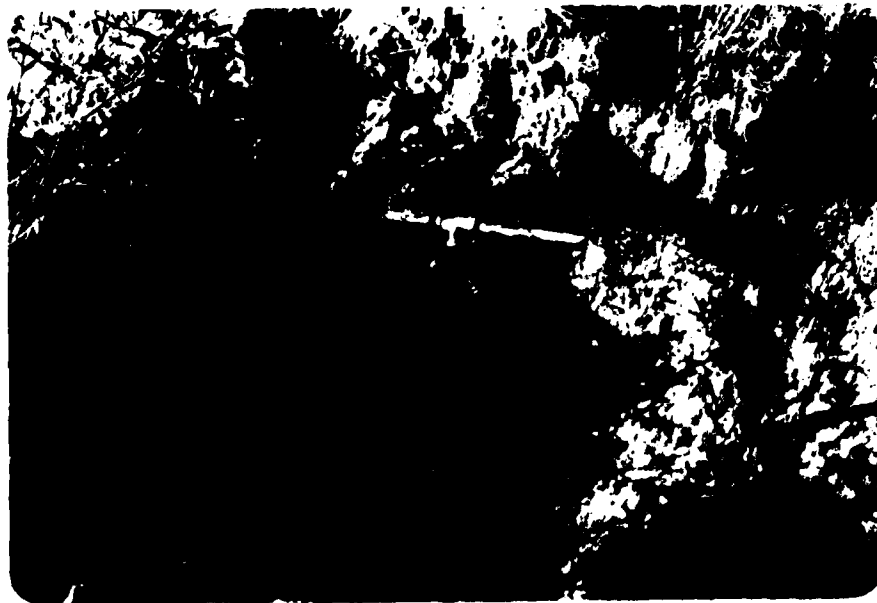


PHOTO NO. 13 - VIEW OF HEAD CUT.

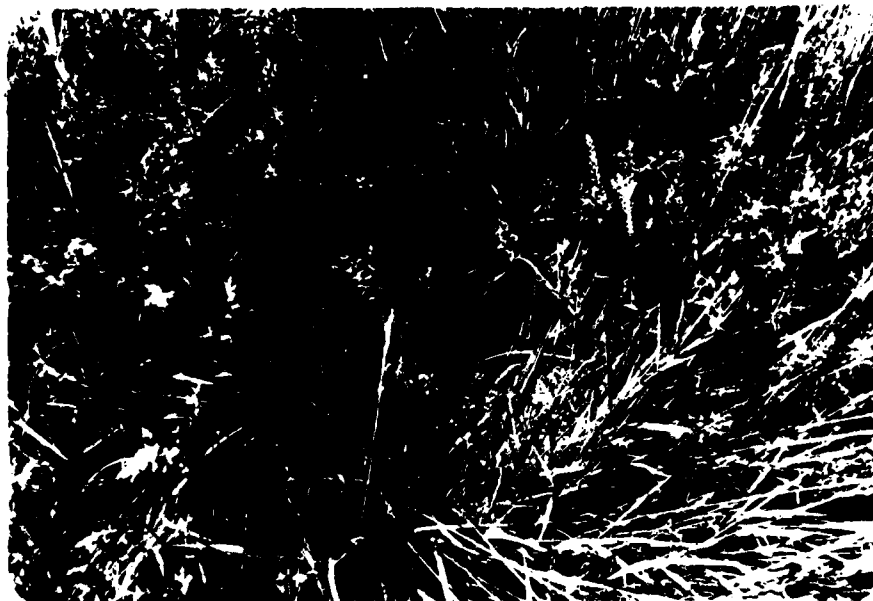


PHOTO NO. 14 - LARGE RODENT HOLE AT STA. 7+00.



PHOTO NO. 15 - VIEW DOWNSTREAM FROM STA. 7+00 SHOWING FARM PONDS.

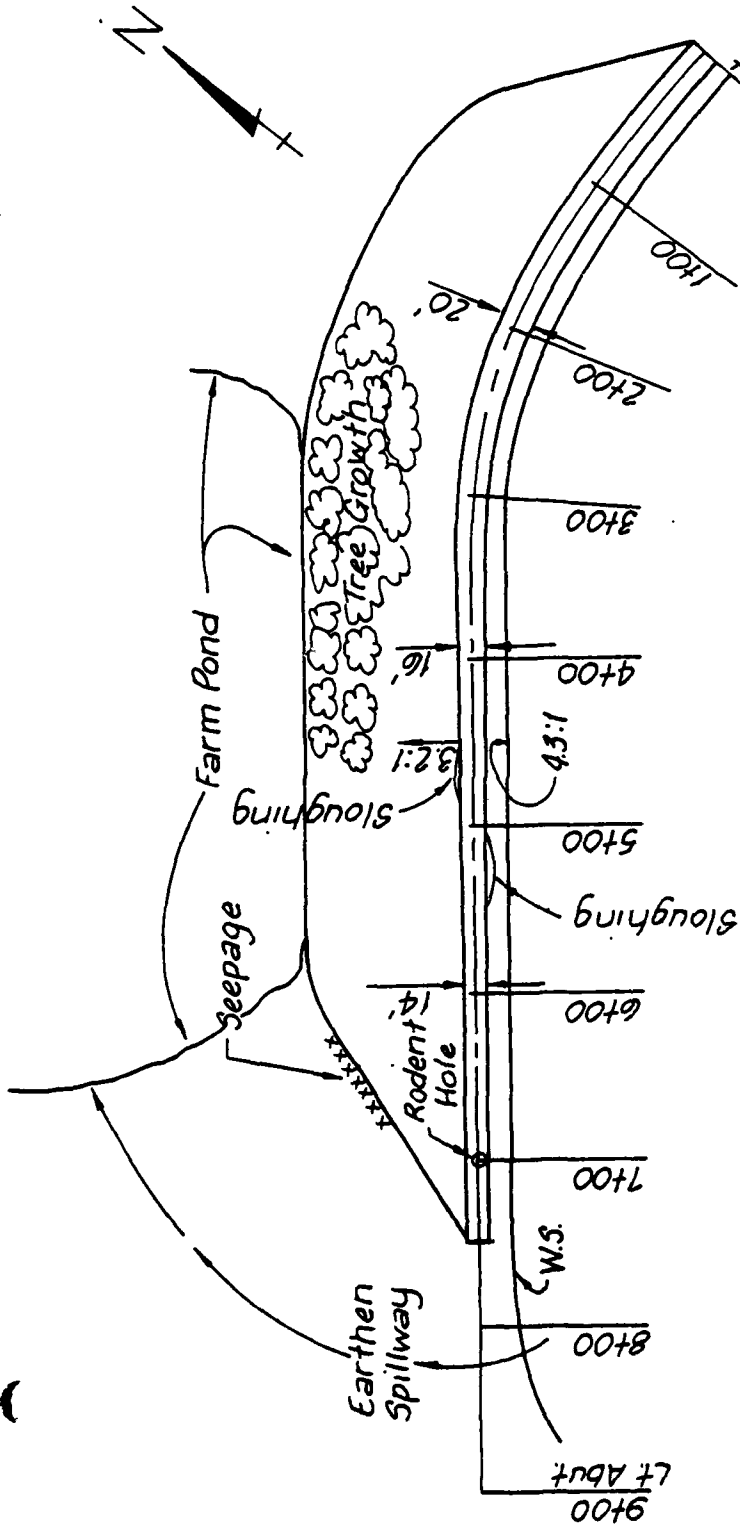


PHOTO NO. 16 - VIEW UPSTREAM FROM STA. 4+50.

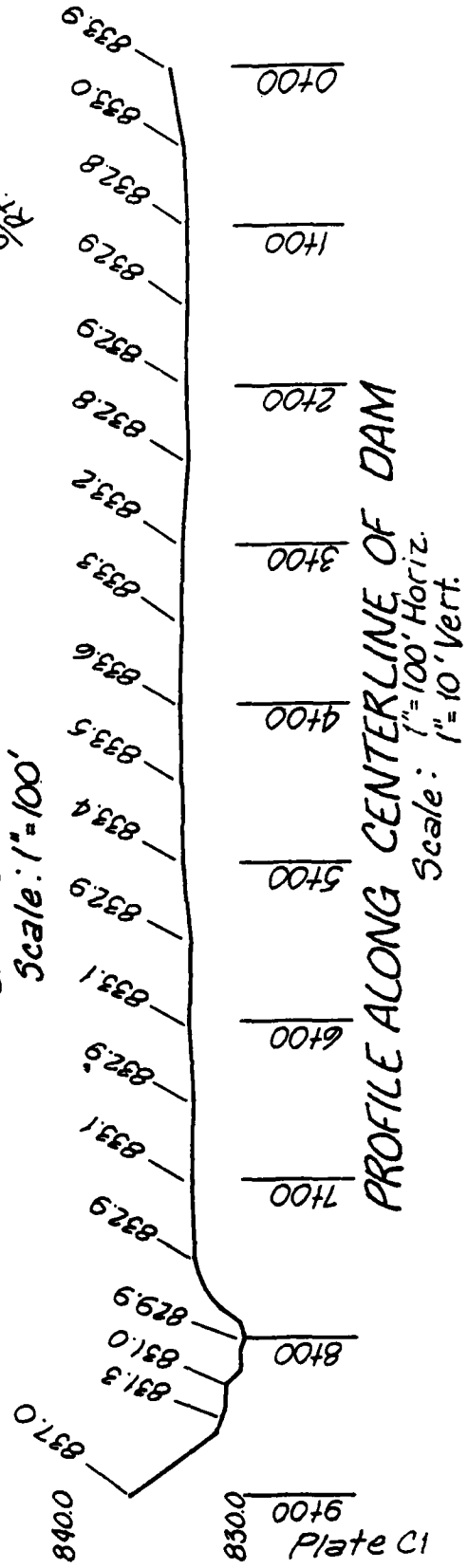


PHOTO NO. 17 - VIEW DOWNSTREAM FROM STA. 4+50.

APPENDIX C
PROJECT PLATES

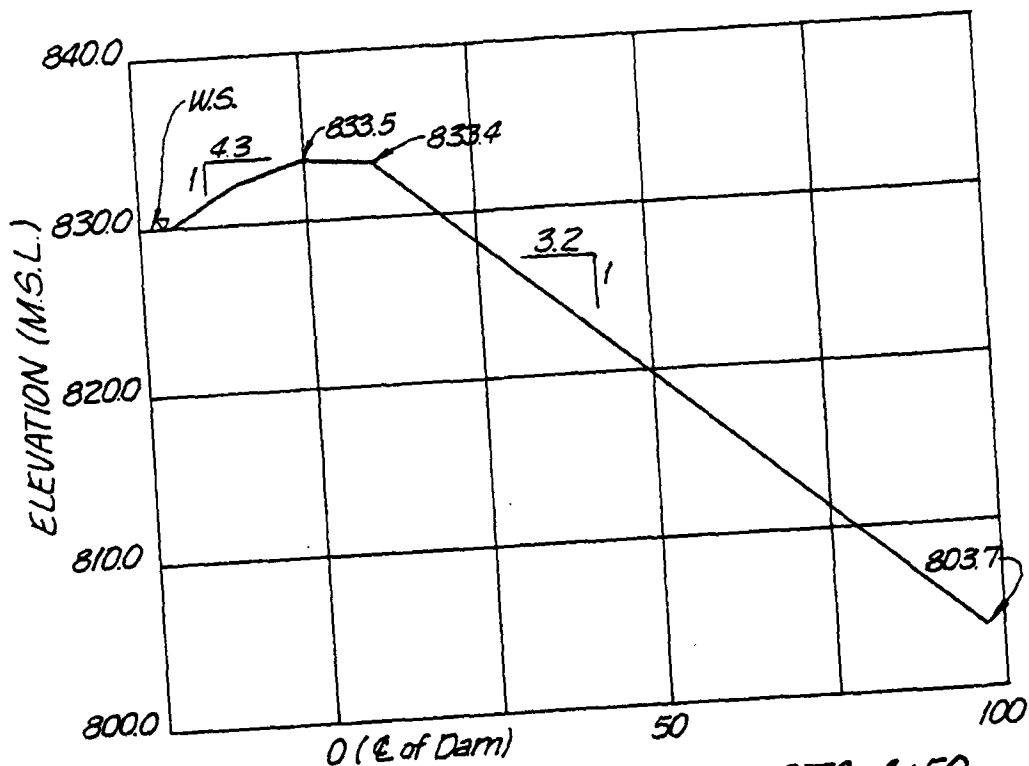


PLAN OF DAM
Scale: 1"=100'

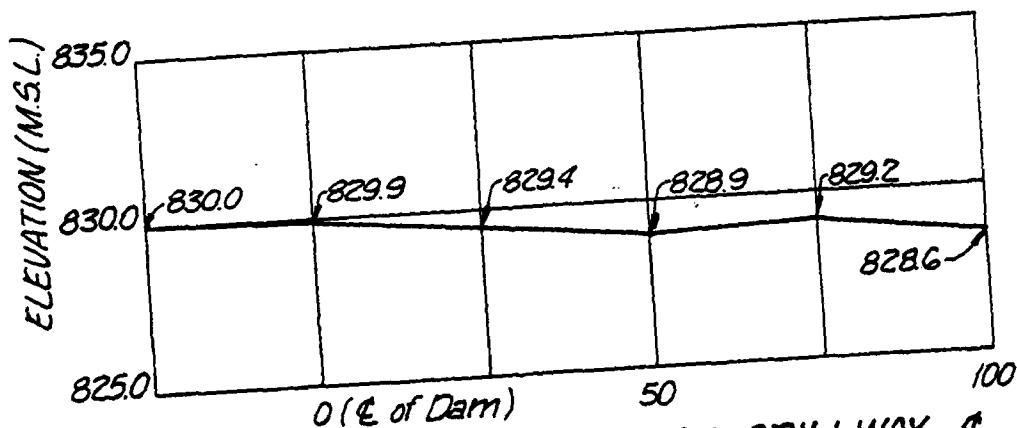


PROFILE ALONG CENTERLINE OF DAM

Scale: 1"=100' Horiz.
1"=10' Vert.

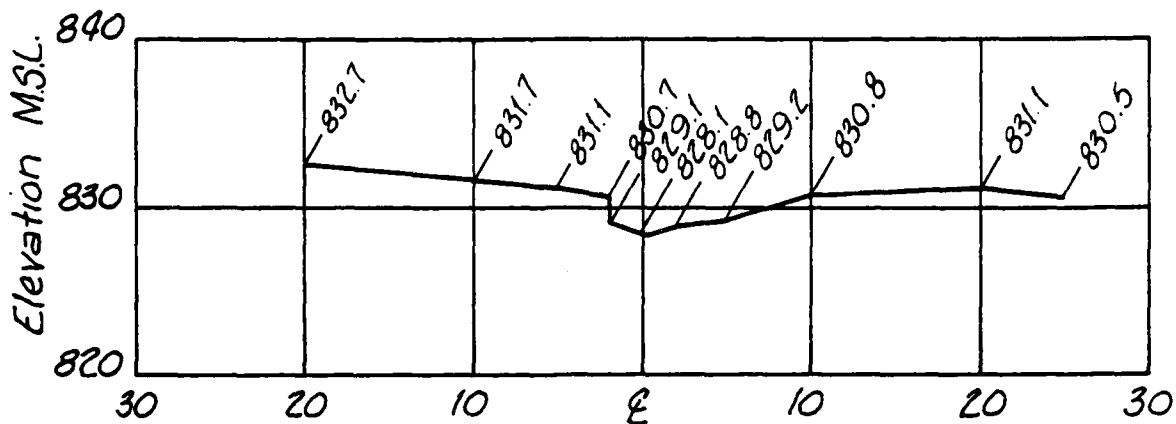


DAM SECTION @ STA. 4+50
 Scale: 1" = 25' Horiz.
 1" = 10' Vert.



PROFILE OF EMERGENCY SPILLWAY @
 Scale: 1" = 25' Horiz.
 1" = 5' Vert.

Plate C2



CROSS-SECTION OF EMERGENCY SPILLWAY
125 FEET DOWNSTREAM OF DAM @
Scale: 1"=10' Horiz.
1"=10' Vert.

APPENDIX D
HYDRAULIC AND HYDROLOGIC DATA

HYDROLOGIC COMPUTATIONS

1. The SCS dimensionless unit hydrograph and the systemized computer program HEC-1 (Dam Safety Version), July 1978, prepared by the Hydrologic Engineering Center, U.S. Corps of Engineers, Davis, California, were used to develop the inflow hydrographs.

a. Twenty-four hour, 100-year rainfall for the dam location was taken from the data for the rainfall station at Moberly, Missouri, as supplied by the St. Louis District, Corps of Engineers per their letter dated 6 March 1979. The twenty-four hour probable maximum precipitation was taken from the curves of Hydrometeorological Report No. 33 and current Corps of Engineers and St. Louis policy and guidance for hydraulics and hydrology.

b. Drainage area = 0.096 square miles (61.3 acres).

c. Time of concentration of runoff equals 16 minutes. Due to the small size of the watershed, Soil Conservation Service methods from Chapter 15 of NEH 4 were used to determine the time of concentration.

d. The antecedent storm conditions for the probable maximum precipitation were heavy rainfall and low temperatures which occurred on the previous 5 days (SCS AMC III). The antecedent storm conditions for the 100-year precipitation were an average of the conditions which have preceded the occurrence of the maximum annual flood on numerous watersheds (SCS AMC II). The initial pool elevation was assumed at the spillway crest.

e. The total twenty-four hour storm duration losses for the 100-year storm were 2.54 inches. The total losses for the PMF storm were 1.30 inches. These losses are based on SCS runoff curve No. 90 and No. 78 for antecedent moisture conditions, SCS AMC III and AMC II respectively. The watershed is composed of primarily SCS soil group C & D (Lindley, Keswick, Hattan) and consists mostly of grassland and woodland.

f. Average soil loss rate = 0.05 inch per hour for the P.M.F.

2. The discharge rating for the spillway was developed using the Corps of Engineers Water Surface Profile HEC-2 computer program.

The discharge rating for flow over the dam crest was developed using the HEC-1 (Dam Safety Version) program.

3. Floods were routed through the reservoir using the HEC-1 (Dam Safety Version) program. The input, output, and plotted hydrographs are included in this Appendix.

DIETZEN CORPORATION
MADE IN U.S.A.

NO. 340R-10 DIETZEN GRAPH PAPER
10 X 10 PER INCH

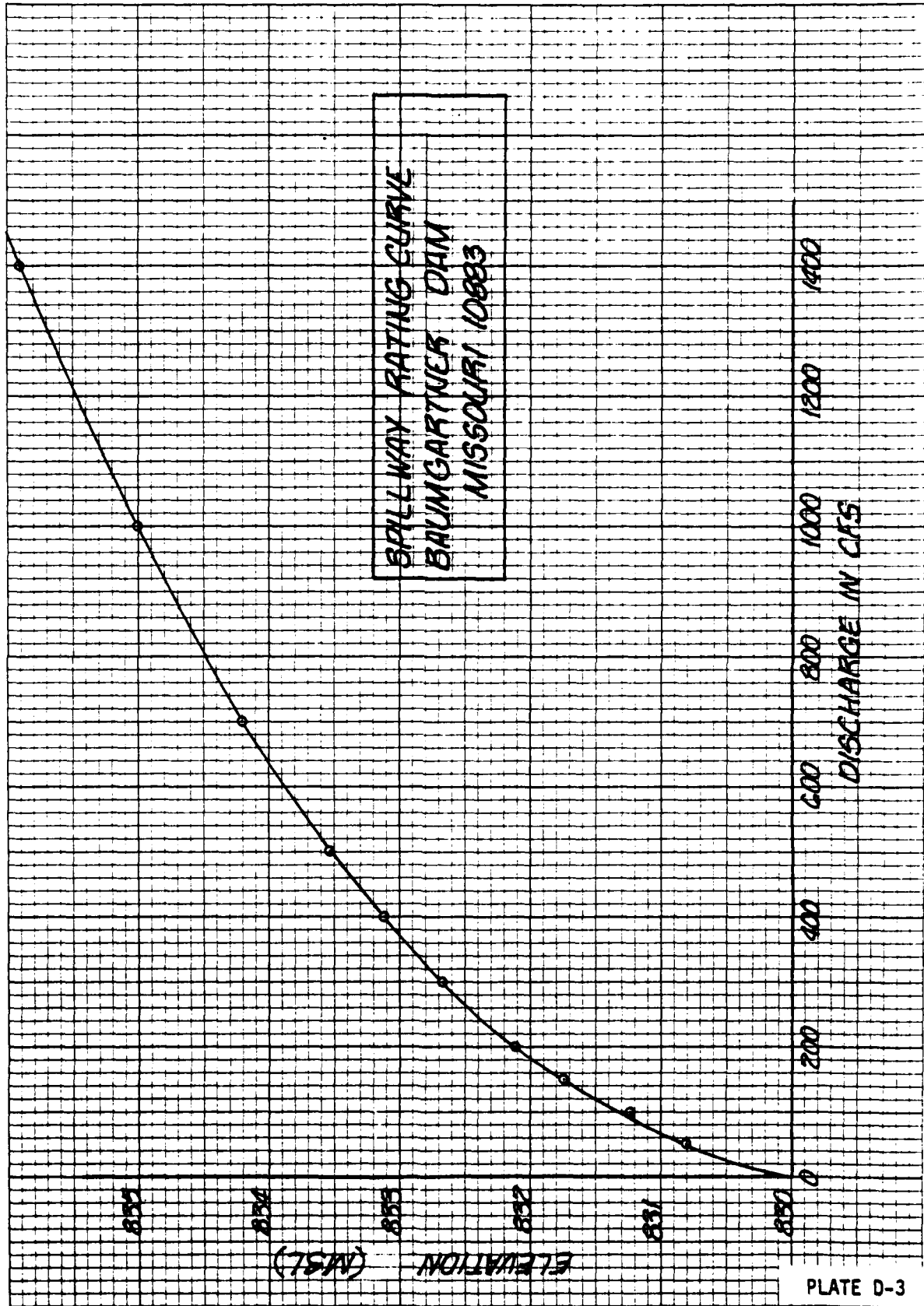
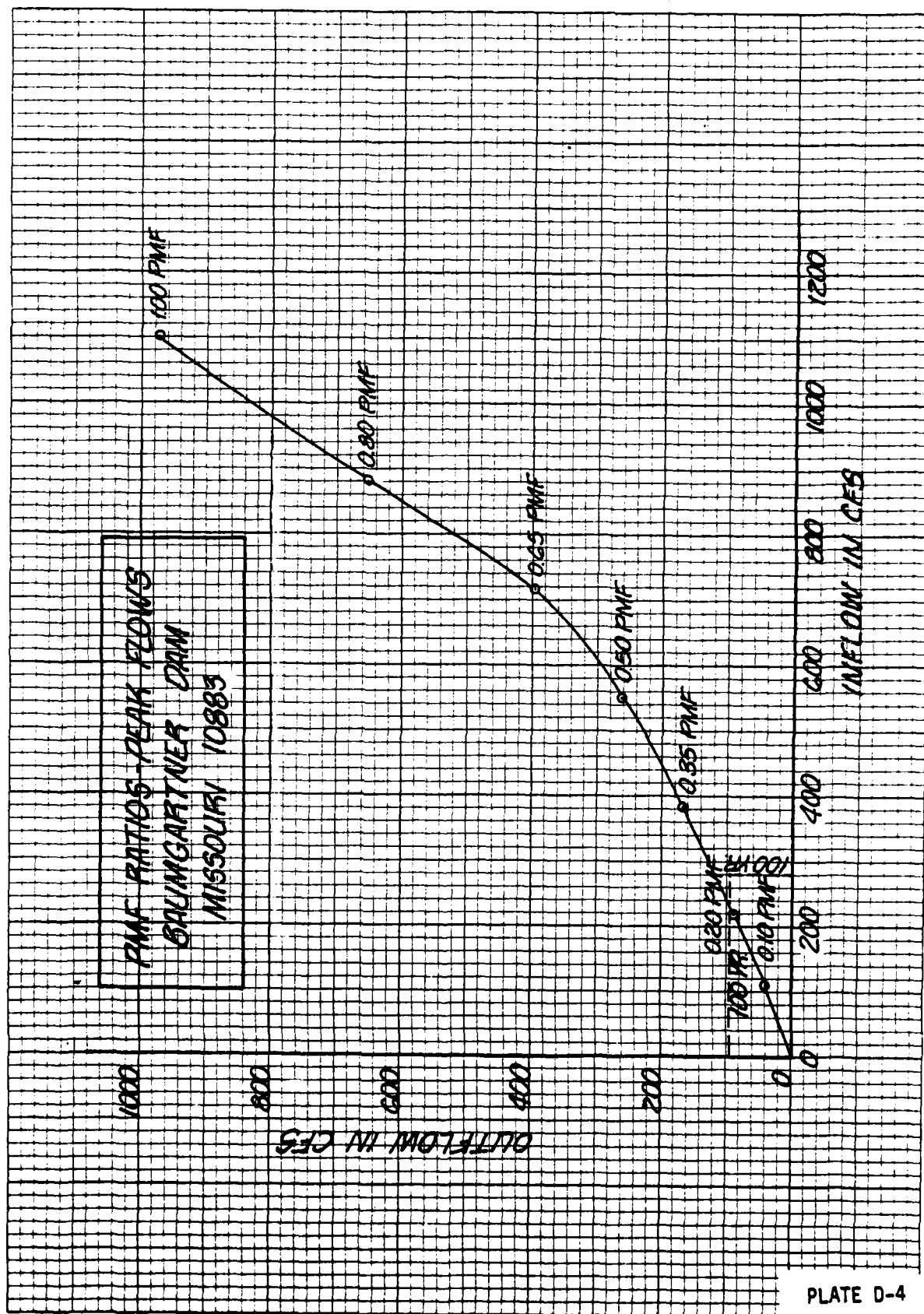


PLATE D-3



 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 24 FEB 79

RUN DATE= 79/02/23.
 TIME= 17.02.10.

MISSOURI DAM INSPECTION 793101
 BAUMGARTNER DAM 10883

RATIOS OF PMF 0.10 0.20 0.35 0.50 0.65 0.80 1.00

JOB SPECIFICATION

NO	MHR	MMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	INSTAN
288	0	5	0	0	0	0	0	3	0

MULTI-PLAN ANALYSES TO BE PERFORMED

PLAN= 1 NRTIO= 7 LRTIO= 1
 R105= .10 .20 .35 .50 .65 .80 1.00

SUB-AREA RUNOFF COMPUTATION

CALCULATION OF INFLOW HYDROGRAPH TO BAUMGARTNER DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
000001	0	0	0	2	0	1	0	0

HYDROGRAPH DATA

INHYG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNDW	ISAME	LOCAL
1	2	.10	0.00	.10	1.00	0.000	0	1	0

PRECIP DATA

SPEE	PHS	RA	R12	R24	R48	R72	R96
0.00	24.80	102.00	121.00	130.00	0.00	0.00	0.00

LOSS DATA

LROPT	STRKA	DLTKR	RTIOL	ERAIN	SIRKS	RTIOK	STRYL	CNSTL	ALSMK	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	-1.00	-90.00	0.00	0.00

CURVE NO = -90.00 NETNESS = -1.00 EFFECT CN = 90.00

UNIT HYDROGRAPH DATA

TC= 0.00 LAG= .17

RECESSION DATA

SIRTO= 0.00 ORCSN= -.01 RTIOR= 1.00

UNIT HYDROGRAPH 12 END OF PERIOD ORIGINATES. IC= 0.00 HOURS LAG= .17 VOL= 1.00
 67. 202. 130. 65. 35. 18. 10. 5. 3.

END-OF-PERIOD FLOW

0

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	0.05	1	-01	0.00	-01	0.	1.01	12.05	145	-21	-20	-01	57.
1.01	0.10	2	-01	0.00	-01	0.	1.01	12.10	146	-21	-21	-01	57.
1.01	0.15	3	-01	0.00	-01	0.	1.01	12.15	147	-21	-21	-01	114.
1.01	0.20	4	-01	0.00	-01	0.	1.01	12.20	148	-21	-21	-00	133.
1.01	0.25	5	-01	0.00	-01	0.	1.01	12.25	149	-21	-21	-00	152.
1.01	0.30	6	-01	0.00	-01	0.	1.01	12.30	150	-21	-21	-00	148.
1.01	0.35	7	-01	0.00	-01	0.	1.01	12.35	151	-21	-21	-00	150.
1.01	0.40	8	-01	0.00	-01	0.	1.01	12.40	152	-21	-21	-00	152.
1.01	0.45	9	-01	0.00	-01	0.	1.01	12.45	153	-21	-21	-00	153.
1.01	0.50	10	-01	0.00	-01	0.	1.01	12.50	154	-21	-21	-00	153.
1.01	0.55	11	-01	0.00	-01	0.	1.01	12.55	155	-21	-21	-00	154.
1.01	1.00	12	-01	0.00	-01	0.	1.01	13.00	156	-21	-21	-00	154.
1.01	1.05	13	-01	0.00	-01	0.	1.01	13.05	157	-25	-25	-00	157.
1.01	1.10	14	-01	0.00	-01	0.	1.01	13.10	158	-25	-25	-00	162.
1.01	1.15	15	-01	0.00	-01	0.	1.01	13.15	159	-25	-25	-00	174.
1.01	1.20	16	-01	0.00	-01	0.	1.01	13.20	160	-25	-25	-00	180.
1.01	1.25	17	-01	0.00	-01	0.	1.01	13.25	161	-25	-25	-00	182.
1.01	1.30	18	-01	0.00	-01	0.	1.01	13.30	162	-25	-25	-00	184.
1.01	1.35	19	-01	0.00	-01	0.	1.01	13.35	163	-25	-25	-00	185.
1.01	1.40	20	-01	0.00	-01	0.	1.01	13.40	164	-25	-25	-00	185.
1.01	1.45	21	-01	0.00	-01	0.	1.01	13.45	165	-25	-25	-00	186.
1.01	1.50	22	-01	0.00	-01	0.	1.01	13.50	166	-25	-25	-00	186.
1.01	1.55	23	-01	0.00	-01	0.	1.01	13.55	167	-25	-25	-00	186.
1.01	2.00	24	-01	0.00	-01	1.	1.01	14.00	168	-25	-25	-00	186.
1.01	2.05	25	-01	0.00	-01	1.	1.01	14.05	169	-32	-31	-00	190.
1.01	2.10	26	-01	0.00	-01	1.	1.01	14.10	170	-32	-31	-00	203.
1.01	2.15	27	-01	0.00	-01	1.	1.01	14.15	171	-32	-31	-00	216.
1.01	2.20	28	-01	0.00	-01	1.	1.01	14.20	172	-32	-31	-00	224.
1.01	2.25	29	-01	0.00	-01	1.	1.01	14.25	173	-32	-31	-00	229.
1.01	2.30	30	-01	0.00	-01	2.	1.01	14.30	174	-32	-31	-00	231.
1.01	2.35	31	-01	0.00	-01	2.	1.01	14.35	175	-32	-31	-00	232.
1.01	2.40	32	-01	0.00	-01	2.	1.01	14.40	176	-32	-31	-00	233.
1.01	2.45	33	-01	0.00	-01	2.	1.01	14.45	177	-32	-31	-00	233.
1.01	2.50	34	-01	0.00	-01	2.	1.01	14.50	178	-32	-31	-00	233.
1.01	2.55	35	-01	0.00	-01	2.	1.01	14.55	179	-32	-31	-00	234.
1.01	3.00	36	-01	0.00	-01	2.	1.01	15.00	180	-32	-31	-00	234.
1.01	3.05	37	-01	0.00	-01	3.	1.01	15.05	181	-19	-19	-00	235.
1.01	3.10	38	-01	0.00	-01	3.	1.01	15.10	182	-38	-38	-00	235.
1.01	3.15	39	-01	0.00	-01	3.	1.01	15.15	183	-38	-38	-00	226.
1.01	3.20	40	-01	0.00	-01	3.	1.01	15.20	184	-58	-57	-00	263.
1.01	3.25	41	-01	0.00	-01	3.	1.01	15.25	185	-67	-67	-00	325.
1.01	3.30	42	-01	0.00	-01	3.	1.01	15.30	186	1.63	1.63	-01	456.
1.01	3.35	43	-01	0.00	-01	3.	1.01	15.35	187	2.69	2.68	-01	768.
1.01	3.40	44	-01	0.00	-01	3.	1.01	15.40	188	1.06	1.05	-00	1098.
1.01	3.45	45	-01	0.00	-01	4.	1.01	15.45	189	-67	-67	-00	1102.
1.01	3.50	46	-01	0.00	-01	4.	1.01	15.50	190	-58	-58	-00	887.
1.01	3.55	47	-01	0.00	-01	4.	1.01	15.55	191	-38	-38	-00	679.
1.01	4.00	48	-01	0.00	-01	4.	1.01	16.00	192	-38	-38	-00	513.
1.01	4.05	49	-01	0.00	-01	4.	1.01	16.05	193	-30	-29	-00	403.
1.01	4.10	50	-01	0.00	-01	4.	1.01	16.10	194	-30	-29	-00	326.
1.01	4.15	51	-01	0.00	-01	4.	1.01	16.15	195	-30	-29	-00	277.
1.01	4.20	52	-01	0.00	-01	4.	1.01	16.20	196	-30	-29	-00	249.
1.01	4.25	53	-01	0.00	-01	4.	1.01	16.25	197	-30	-29	-00	232.
1.01	4.30	54	-01	0.00	-01	4.	1.01	16.30	198	-30	-29	-00	226.
1.01	4.35	55	-01	0.00	-01	4.	1.01	16.35	199	-30	-29	-00	222.
1.01	4.40	56	-01	0.00	-01	4.	1.01	16.40	200	-30	-29	-00	220.
1.01	4.45	57	-01	0.00	-01	5.	1.01	16.45	201	-30	-29	-00	219.
1.01	4.50	58	-01	0.00	-01	5.	1.01	16.50	202	-30	-29	-00	219.
1.01	4.55	59	-01	0.00	-01	5.	1.01	16.55	203	-30	-29	-00	219.
1.01	5.00	60	-01	0.00	-01	5.	1.01	17.00	204	-30	-29	-00	219.

PLATE D-7

1.01	5.05	61	-01	-01	-01	5.	1.01	17.05	205	-23	-23	-00	215.
1.01	5.10	62	-01	-01	-01	5.	1.01	17.10	206	-23	-23	-00	202.
1.01	5.15	63	-01	-01	-01	5.	1.01	17.15	207	-23	-23	-00	189.
1.01	5.20	64	-01	-01	-01	5.	1.01	17.20	208	-23	-23	-00	181.
1.01	5.25	65	-01	-01	-01	5.	1.01	17.25	209	-23	-23	-00	177.
1.01	5.30	66	-01	-01	-01	5.	1.01	17.30	210	-23	-23	-00	174.
1.01	5.35	67	-01	-01	-01	5.	1.01	17.35	211	-23	-23	-00	173.
1.01	5.40	68	-01	-01	-01	5.	1.01	17.40	212	-23	-23	-00	173.
1.01	5.45	69	-01	-01	-01	5.	1.01	17.45	213	-23	-23	-00	172.
1.01	5.50	70	-01	-01	-01	5.	1.01	17.50	214	-23	-23	-00	172.
1.01	5.55	71	-01	-01	-01	5.	1.01	17.55	215	-23	-23	-00	172.
1.01	6.00	72	-01	-01	-01	5.	1.01	18.00	216	-23	-23	-00	172.
1.01	6.05	73	-07	-04	-02	15.	1.01	18.05	217	-02	-02	-00	158.
1.01	6.10	74	-07	-04	-02	15.	1.01	18.10	218	-02	-02	-00	115.
1.01	6.15	75	-07	-04	-02	22.	1.01	18.15	219	-02	-02	-00	71.
1.01	6.20	76	-07	-05	-02	27.	1.01	18.20	220	-02	-02	-00	43.
1.01	6.25	77	-07	-05	-02	30.	1.01	18.25	221	-02	-02	-00	29.
1.01	6.30	78	-07	-05	-02	32.	1.01	18.30	222	-02	-02	-00	22.
1.01	6.35	79	-07	-05	-02	34.	1.01	18.35	223	-02	-02	-00	18.
1.01	6.40	80	-07	-05	-02	35.	1.01	18.40	224	-02	-02	-00	16.
1.01	6.45	81	-07	-05	-01	36.	1.01	18.45	225	-02	-02	-00	15.
1.01	6.50	82	-07	-05	-01	37.	1.01	18.50	226	-02	-02	-00	14.
1.01	6.55	83	-07	-05	-01	37.	1.01	18.55	227	-02	-02	-00	14.
1.01	7.00	84	-07	-05	-01	38.	1.01	19.00	228	-02	-02	-00	14.
1.01	7.05	85	-07	-05	-01	39.	1.01	19.05	229	-02	-02	-00	14.
1.01	7.10	86	-07	-05	-01	39.	1.01	19.10	230	-02	-02	-00	14.
1.01	7.15	87	-07	-05	-01	40.	1.01	19.15	231	-02	-02	-00	14.
1.01	7.20	88	-07	-06	-01	40.	1.01	19.20	232	-02	-02	-00	14.
1.01	7.25	89	-07	-06	-01	40.	1.01	19.25	233	-02	-02	-00	14.
1.01	7.30	90	-07	-06	-01	41.	1.01	19.30	234	-02	-02	-00	14.
1.01	7.35	91	-07	-06	-01	41.	1.01	19.35	235	-02	-02	-00	14.
1.01	7.40	92	-07	-06	-01	41.	1.01	19.40	236	-02	-02	-00	14.
1.01	7.45	93	-07	-06	-01	42.	1.01	19.45	237	-02	-02	-00	14.
1.01	7.50	94	-07	-06	-01	42.	1.01	19.50	238	-02	-02	-00	14.
1.01	7.55	95	-07	-06	-01	42.	1.01	19.55	239	-02	-02	-00	14.
1.01	8.00	96	-07	-06	-01	43.	1.01	20.00	240	-02	-02	-00	14.
1.01	8.05	97	-07	-06	-01	43.	1.01	20.05	241	-02	-02	-00	14.
1.01	8.10	98	-07	-06	-01	43.	1.01	20.10	242	-02	-02	-00	14.
1.01	8.15	99	-07	-06	-01	43.	1.01	20.15	243	-02	-02	-00	14.
1.01	8.20	100	-07	-06	-01	44.	1.01	20.20	244	-02	-02	-00	14.
1.01	8.25	101	-07	-06	-01	44.	1.01	20.25	245	-02	-02	-00	14.
1.01	8.30	102	-07	-06	-01	44.	1.01	20.30	246	-02	-02	-00	14.
1.01	8.35	103	-07	-06	-01	44.	1.01	20.35	247	-02	-02	-00	14.
1.01	8.40	104	-07	-06	-01	44.	1.01	20.40	248	-02	-02	-00	14.
1.01	8.45	105	-07	-06	-01	44.	1.01	20.45	249	-02	-02	-00	14.
1.01	8.50	106	-07	-06	-01	45.	1.01	20.50	250	-02	-02	-00	14.
1.01	8.55	107	-07	-06	-00	45.	1.01	20.55	251	-02	-02	-00	14.
1.01	9.00	108	-07	-06	-00	45.	1.01	21.00	252	-02	-02	-00	14.
1.01	9.05	109	-07	-06	-00	45.	1.01	21.05	253	-02	-02	-00	14.
1.01	9.10	110	-07	-06	-00	45.	1.01	21.10	254	-02	-02	-00	14.
1.01	9.15	111	-07	-06	-00	45.	1.01	21.15	255	-02	-02	-00	14.
1.01	9.20	112	-07	-06	-00	45.	1.01	21.20	256	-02	-02	-00	14.
1.01	9.25	113	-07	-06	-00	45.	1.01	21.25	257	-02	-02	-00	14.
1.01	9.30	114	-07	-06	-00	45.	1.01	21.30	258	-02	-02	-00	14.
1.01	9.35	115	-07	-06	-00	46.	1.01	21.35	259	-02	-02	-00	14.
1.01	9.40	116	-07	-06	-00	46.	1.01	21.40	260	-02	-02	-00	14.
1.01	9.45	117	-07	-06	-00	46.	1.01	21.45	261	-02	-02	-00	14.
1.01	9.50	118	-07	-06	-00	46.	1.01	21.50	262	-02	-02	-00	14.
1.01	9.55	119	-07	-06	-00	46.	1.01	21.55	263	-02	-02	-00	14.
1.01	10.00	120	-07	-06	-00	46.	1.01	22.00	264	-02	-02	-00	14.
1.01	10.05	121	-07	-06	-00	46.	1.01	22.05	265	-02	-02	-00	14.
1.01	10.10	122	-07	-06	-00	46.	1.01	22.10	266	-02	-02	-00	14.

1.01	10.15	123	.07	.06	.00	46.	1.01	22.15	267	.02	.02	.00	14.
1.01	10.20	124	.07	.06	.00	46.	1.01	22.20	268	.02	.02	.00	14.
1.01	10.25	125	.07	.06	.00	46.	1.01	22.25	269	.02	.02	.00	14.
1.01	10.30	126	.07	.06	.00	46.	1.01	22.30	270	.02	.02	.00	14.
1.01	10.35	127	.07	.06	.00	46.	1.01	22.35	271	.02	.02	.00	14.
1.01	10.40	128	.07	.06	.00	46.	1.01	22.40	272	.02	.02	.00	14.
1.01	10.45	129	.07	.06	.00	47.	1.01	22.45	273	.02	.02	.00	14.
1.01	10.50	130	.07	.06	.00	47.	1.01	22.50	274	.02	.02	.00	14.
1.01	10.55	131	.07	.06	.00	47.	1.01	22.55	275	.02	.02	.00	14.
1.01	11.00	132	.07	.06	.00	47.	1.01	23.00	276	.02	.02	.00	14.
1.01	11.05	133	.07	.06	.00	47.	1.01	23.05	277	.02	.02	.00	14.
1.01	11.10	134	.07	.06	.00	47.	1.01	23.10	278	.02	.02	.00	14.
1.01	11.15	135	.07	.06	.00	47.	1.01	23.15	279	.02	.02	.00	14.
1.01	11.20	136	.07	.06	.00	47.	1.01	23.20	280	.02	.02	.00	14.
1.01	11.25	137	.07	.06	.00	47.	1.01	23.25	281	.02	.02	.00	14.
1.01	11.30	138	.07	.06	.00	47.	1.01	23.30	282	.02	.02	.00	14.
1.01	11.35	139	.07	.06	.00	47.	1.01	23.35	283	.02	.02	.00	14.
1.01	11.40	140	.07	.06	.00	47.	1.01	23.40	284	.02	.02	.00	14.
1.01	11.45	141	.07	.06	.00	47.	1.01	23.45	285	.02	.02	.00	14.
1.01	11.50	142	.07	.06	.00	47.	1.01	23.50	286	.02	.02	.00	14.
1.01	11.55	143	.07	.06	.00	47.	1.01	23.55	287	.02	.02	.00	14.
1.01	12.00	144	.07	.06	.00	47.	1.02	0.00	288	.02	.02	.00	14.
SUM 32.24 30.94 1.30 22971.										(819.11 786.11 33.11 650.571)			
PEAK 1.02 31.													
6-HOUR 257.													
24-HOUR 80.													
72-HOUR 80.													
TOTAL VOLUME 22954.													
CES 7.													
CMS 24.92													
INCHES 632.85													
30.89													
785.66													
30.89													
785.66													
128.													
158.													
157.													
195.													
THOUS CU M													

00VN*

HYDROGRAPH AT STA000001 FOR PLAN 1, RTIO 1

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	110.	24.	8.	8.	2295.
CMS	3.	1.	0.	0.	65.
INCHES		2.49	3.09	3.09	3.09
MM		63.29	78.47	78.47	78.47
AC-FI		13.	16.	16.	16.
THOUS CU M		16.	19.	19.	19.

HYDROGRAPH AT STA000001 FOR PLAN 1, RTIO 2

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	220.	51.	16.	16.	4591.
CMS	6.	1.	0.	0.	130.
INCHES		4.98	6.18	6.18	6.18
MM		126.57	156.93	156.93	156.93
AC-FI		26.	32.	32.	32.
THOUS CU M		31.	39.	39.	39.

HYDROGRAPH AT STA000001 FOR PLAN 1, RTIO 3

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	386.	90.	28.	28.	8034.
CMS	11.	3.	1.	1.	227.
INCHES		8.72	10.81	10.81	10.81
MM		221.50	274.63	274.63	274.63
AC-FI		55.	55.	55.	55.
THOUS CU M		55.	68.	68.	68.

HYDROGRAPH AT STA000001 FOR PLAN 1, RTIO 4

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	551.	129.	40.	40.	11477.
CMS	16.	4.	1.	1.	323.
INCHES		12.46	15.45	15.45	15.45
MM		316.43	392.33	392.33	392.33
AC-FI		44.	79.	79.	79.
THOUS CU M		79.	97.	97.	97.

HYDROGRAPH AT STA000001 FOR PLAN 1, RTIO 5

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	716.	167.	52.	52.	14920.
CMS	20.	5.	1.	1.	422.
INCHES		16.20	20.08	20.08	20.08
MM		411.35	510.03	510.03	510.03
AC-FI		83.	103.	103.	103.
THOUS CU M		102.	127.	127.	127.

HYDROGRAPH AT STA000001 FOR PLAN 1, RTIO 6

CE	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
881.	25.	206.	64.	2.	18363.
CHS					
INCHES					
		19.93	24.71	24.71	520.
AC-FT		506.28	627.73	627.73	24.71
THOUS CU M		102.	126.	126.	627.73
		126.	156.	156.	126.
					156.

HYDROGRAPH AT STA000001 FOR PLAN 1, RTIO 7

CE	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
1102.	31.	257.	80.	2.	22936.
CHS					
INCHES					
		24.92	30.89	30.89	650.
AC-FT		632.83	786.66	786.66	30.89
THOUS CU M		128.	158.	158.	786.66
		157.	195.	195.	158.
					195.

HYDROGRAPH ROUTING

RESERVOIR ROUTING DE HYDROGRAPH AT BAUMGARTNER DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
000002	1	0	0	2	0	1	0	0
QLOSS	CLOSS	AVG	IRCS	ISAME	IOPT	IPMP	LSTR	
0.0	0.000	0.00	1	1	0	0	0	

NSTPS	NSTD	LAG	ANSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-830.	-1

STAGE	830.00	830.81	831.76	832.12	832.66	833.13	833.53	834.19	835.00	835.89
FLOW	0.00	50.00	150.00	200.00	300.00	400.00	500.00	700.00	1000.00	1400.00

SURFACE AREA= 0. 2. 7. 17.

CAPACITY= 0. 3. 42. 158.

ELEVATION= 815. 820. 830. 840.

CREL	SPMLD	COQM	EXPM	ELEV	COOL	CAREA	EXPL
830.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LAH DATA

TOPEL	COOD	EXPD	DAHWD
832.8	3.0	1.5	0.

CREST LENGTH	10.	190.	430.	650.	750.	750.
AT OR BELOW						
ELEVATION	832.8	832.9	833.0	833.5	834.0	836.0

STATION 000002, PLAN 1, RATIO 4 (0.50 RIF)

END-OF-PERIOD HYDROGRAPH ORDINATES

[illegible]

STORAGE

Year	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979	2980	2981	2982	2983	2984	2985	2986	2987	2988	2989	2990	2991	2992	2993	2994	2995	2996	2997	2998	2999	3000
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QDVFS

STATION000002

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(O)										
0.	100.	200.	300.	400.	500.	600.	0.	0.	0.	0.
.05 11
.10 21
.15 31
.20 41
.25 51
.30 61
.35 71
.40 81
.45 91
.50 101
.55 111
1.00 121
1.05 131
1.10 141
1.15 151
1.20 161
1.25 171
1.30 181
1.35 191
1.40 201
1.45 211
1.50 221
1.55 231
2.00 241
2.05 251
2.10 261
2.15 271
2.20 281
2.25 291
2.30 301
2.35 311
2.40 321
2.45 331
2.50 341
2.55 351
3.00 361
3.05 371
3.10 381
3.15 391
3.20 401
3.25 411
3.30 421
3.35 431
3.40 441
3.45 451
3.50 461
3.55 471
4.00 481
4.05 491
4.10 501
4.15 511
4.20 521
4.25 531
4.30 541
4.35 551
4.40 561

20.15203.10
20.20204.10
20.25205.10
20.30206.10
20.35207.10
20.40208.10
20.45209.10
20.50210.10
20.55211.10
21.00212.10
21.05213.10
21.10214.10
21.15215.10
21.20216.10
21.25217.10
21.30218.10
21.35219.10
21.40220.10
21.45221.10
21.50222.10
21.55223.10
22.00224.10
22.05225.10
22.10226.10
22.15227.10
22.20228.10
22.25229.10
22.30230.10
22.35231.10
22.40232.10
22.45233.10
22.50234.10
22.55235.10
23.00236.10
23.05237.10
23.10238.10
23.15239.10
23.20240.10
23.25241.10
23.30242.10
23.35243.10
23.40244.10
23.45245.10
23.50246.10
23.55247.10
0.00248.10

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO	1	RATIO	2	RATIO	3	RATIO	4	RATIO	5	RATIO	6	RATIO	7
					.10	.20	.35	.50	.65	.80	1.00						
HYDROGRAPH AT 000001																	
		.10	1	110.	220.	386.	551.	716.	881.	1102.							
		.25	1	3.12	6.24	10.92	15.50	20.28	24.95	31.19							
ROUTED TO 000002																	
		.10	1	40.	91.	172.	266.	395.	557.	977.							
		.25	1	1.12	2.59	4.86	7.54	11.10	18.61	27.65							

END

DATE
FILMED

11-81

DTIC